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## THE PRACTICE OF SCHEDULE AND EXPERIENCE RATING FOR WORKMEN'S COMPENSATION RISKS

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In another article appearing elsewhere in this publication the reader has already been made familiar with the process involved in the determination of manual or basic rates for classifications or industrial groups to be covered by workmen's compensation insurance. It is well recognized, however, that the elaborate process which has resulted in providing basic rates for classes of risks is only the first step towards the ultimate object of ascertaining the correct rate for the individual risk.

The manual which has been established upon the basis of general and class experience contains average rates applicable to classes of risks but not appropriate to individual risks within the class. In the general process of rate-making the underwriters have adopted a number of classifications which cannot, with any degree of accuracy, describe every risk to be assigned to the classification. They were obliged to select pure premiums on a judgment basis in those cases where the class experience was insufficient to produce a reliable pure premium.

Practically every class for which a basic rate has been determined includes a number of risks that vary materially with respect to their physical and moral conditions. It is obvious that to charge the basic rate provided in the manual for each risk within a given classification does not promote the ends of justice. Equity demands that differentiation should be made between rates for employers who have modern plants and those for other employers in the same class whose workshops and equipment are of an inferior type. In order to justly discriminate in the rating of risks varying as to conditions with respect to safety, *merit rating* systems have been inaugurated with the object of providing an individual rate for each risk, such individual rate depending upon the physical and moral conditions in the plant. Two distinct systems are in use for that purpose, *schedule rating* and *experience rating*.

## SCHEDULE RATING

"Schedule Rating" may be defined as a method of rating whereby it is intended to promote greater equity in the distribution of insurance cost by providing an individual rate for each risk based upon the physical character of the risk. The practice of rating each risk individually upon merit—establishing a rate higher than average for the inferior plant and a rate lower than average for the superior plant—is of important social value as an economic force in *accident prevention* work, to which subject I intend to refer later.

For the purpose of enabling the individual rating of risks through measurement of risk hazard, the underwriters, with the aid of safety engineers, have prepared a rating system referred to in insurance parlance as a "schedule." This schedule makes a complete analysis of the average manufacturing plant and the normal items of hazard that contribute to industrial accidents. This analysis covers among other things the type of building construction, existing facilities for safety of employes against fire and panic hazard, the condition of floors, hoistways, stairs, elevated runways, platforms, boilers, pressure apparatus and steam engines. The schedule provides standard methods for safeguarding machinery and equipment, for the organization of safety committees and the improvement of sanitary and hygienic conditions. In the construction of the schedule the average plant has been taken as the basis and values in the form of rate or premium charges and credits established for the existence or absence of hazardous conditions. The rate values in the present schedule have been determined by interstate committees of underwriters and safety engineers upon the basis of a study of accidents sustained in European and American industries, with particular reference to the causes, severity and frequency of such accidents.

In the application of values, the underwriters have given recognition to three broad divisions of risk hazard: First: catastrophe hazard—All classifications are subject to the panic or catastrophe hazard, and all employes in any given risk are equally affected. The collapse of a building, the occurrence of a fire, the explosion of a boiler or the failure of a tank, are hazards which are not peculiar to any particular industry and not limited to any group of employes. The values for these hazards are, therefore, applied

in the form of flat charges and credits to the manual rate for all classifications, thereby distributing the cost equally among all industries. Second: Hazards peculiar to the industry and affecting all employes—Items relating to power transmission, working machines, proportion of machine operators, safety organization and hygienic conditions are regarded as hazards incidental to the industry, to be valued in proportion to the general rate for the classification. The values are, therefore, expressed in percentage form to the manual rate on the theory that the ultimate premium should be modified in a variable manner for each classification, in proportion to the loss expectancy indicated by the pure premium. Third: Hazards affecting a limited number of employes—Items relating to defective floors, stairways, unprotected elevated runways, unguarded flywheels, transmission gears, clutches, belts, shafting or set screws; absence of elevator safety devices and enclosures, unguarded grinding wheels, absence of safeguards for machinery and engines, present hazards which expose to risk only a part of the employes at a given plant at any given time. The values for these forms of hazard are expressed in flat amounts and applied *not to the rate* which affects the entire pay roll, but to the ultimate premium, estimated at manual rate on basis of average exposure. In the actual application of the schedule it is necessary to inspect each risk and prepare a report describing minutely each item subject to charge or credit.

Under competitive systems of insurance, where the state is charged with rate supervision, it was found necessary to establish state supervised rating organizations for the purpose of making inspections under a uniform schedule, its application to be free from discrimination and competitive influences. Rating organizations of this character have been established in the states of New York, Massachusetts, Pennsylvania and California. Under this system every insurance carrier is required to become a member of the rating organization and to submit to such organization each risk subject to schedule rating. The inspection report on each risk is valued in accordance with the provisions of the schedule and the resulting rate becomes applicable to the risk for a given period. The assured has the privilege of securing a copy of the inspection report and may, with the advice of the insurance carrier or through his own engineers, make such improvements in the plant as the inspection

may indicate and thereafter apply for a reinspection which will result in a lower rate. It is clear that the opportunity to secure reduced rates for improvements made upon expert advice has an important influence in stimulating the work of accident prevention, in reducing the accident rate and thereby lowering the cost of insurance.

The first rating schedule has been criticised mainly on the ground that it resulted in a general decrease of premiums. It has been argued that with a manual of rates based upon average experience and a schedule providing values on the basis of the average risk, the application of the system should result neither in an increase nor in a decrease in the total volume of premiums. It must be borne in mind, however, that the constant improvements which are being made by employers will necessarily result in reduced rates and, therefore, cause a depression in premiums which in theory is justified by reason of the belief that the improved conditions produce a lower accident rate.

The first schedule, known as the Universal Analytic Schedule, applied in the state of New York, produced a net decrease in premium rates as compared with manual rates, approximating 10 per cent in the first two years of its operation and approximating 20 per cent in the last year of its operation. This very substantial decrease was undoubtedly due to the fact that the authors of the schedule had provided credit values for average conditions where no credit should have been allowed and had failed to provide charge values for inferior conditions where such charge values were necessary.

The present Industrial Compensation Rating Schedule, which is now in operation in practically all compensation states, has been so framed as to more closely appraise risks upon the average basis and will undoubtedly produce more balanced results. It is urged frequently, and probably with good reason, that the best sort of a schedule is one that provides values based upon the inferior plant. This kind of a schedule would provide all credits and no charges; its application, however, would not be practical in connection with a system of basic rates established upon the general or average class experience.

The authors of the next rate manual will have to give serious consideration to the premium depression due to schedule rating and

make proper provision in the basic rates to offset this depression by means of a proper differential.

As has been mentioned already, one of the important results of schedule rating has been the stimulation of accident prevention work among manufacturers, who in the first instance have to pay the cost. While the insurance companies have been engaged for a long time under Employers' Liability laws in accident prevention work and have achieved considerable success in urging employers to correct unsafe conditions, it is believed that the most satisfactory work in that direction has been accomplished with the introduction of workmen's compensation laws and systems of schedule rating. Schedule rating offers a direct economic incentive to the employer to equip his plant in accordance with the provided standards, to introduce proper safeguards, to remove dangerous conditions that may lead to panic or catastrophe, to inaugurate systems of safety organization, and to educate the men as to the importance of care and safety through shop committees, bulletin boards and general meetings. The introduction of schedule rating has increased interest in the study of safety standards and has accelerated the movement for uniformity between insurance companies and state authorities. There is still existing a wide conflict between the laws of the various states and the requirements of insurance companies and rating organizations and it will undoubtedly take many years before all inconsistencies are entirely removed, if ever. But there is already in evidence a spirit of helpful coöperation, with a view to removing much of the inevitable confusion due to our territorial and political divisions. Both in Pennsylvania and in New York important steps have been taken to harmonize interpretations and requirements so as to remove as much of the conflict as is practicable and to place the legal requirements upon the same basis as the requirements of the insurance carriers.

A few words should be said about the future possibilities of schedule rating. Considerable attention is now being devoted by thoughtful students to the scientific development of rate-making for workmen's compensation insurance. Much of the philosophic discussion which has recently been published relates to the subject of schedule rating and the future progress of the practice.

The students' attention is particularly directed to recent papers presented before the Casualty Actuarial and Statistical Society of

America by Mr. Albert H. Mowbray and Dr. E. H. Downey.<sup>1</sup> These papers are of special value in pointing out ways and means by which the present system of schedule rating may be improved so as to harmonize the underwriters' purpose to provide equitable rate adjustment with effectiveness for accident prevention and to subject the schedule to statistical control so as to ultimately substitute mathematical values in place of judgment values for specific items of hazard.

There is also the very important question frequently raised by critics as to whether any single rating schedule can be applied universally to the great variety of manufacturing risks that come under observation. For example, underwriters are familiar with the difficulties encountered in the rating of metal and woodworking risks. The problem of providing sufficiently clear and definite classifications for metal workers has been under discussion, to the writer's personal knowledge, for a period of three years. While a special rating formula has been devised and applied to such risks in several compensation states, authorities are not agreed that the method of formula rating is the final solution. Similarly in the case of carpentry shops, planing mills and other woodworking plants the defects of risk classification have to be largely corrected through the process of schedule rating.

There is a strong probability that the authors of future systems of schedule rating will take into consideration the needs of special industries and the wisdom of establishing several special schedules, each intended for a particular group, and there is good reason to believe that a study of special hazards may even lead to the construction of schedules for public service and contracting risks, not included at present in the general scheme of schedule rating.

#### EXPERIENCE RATING

The second system of merit rating which I have described as *experience rating* has been and still is a subject of controversy and division of opinion. As a matter of fact, there are two distinct schools of underwriting, one favoring the use of individual experience as a method of characterizing the risk hazard and as a basis for individual rate-making; the other school frowning upon the system as utterly inapplicable to compensation or any other form of insurance.

<sup>1</sup> *Proceedings of Casualty Actuarial and Statistical Society of America*, Volume 3.

By experience rating we mean a system of merit rating whereby the loss experience for a given risk during a given period is subjected to detailed analysis and, as a result of appraisal, the class or basic rate is modified in accordance with experience of the individual risk. Those who favor experience rating base their argument on the following ground: The systems of schedule rating thus far developed are limited to manufacturing risks; and nothing constructive has yet been done in the direction of schedule rating contracting, public service and other miscellaneous risks. It is urged that such risks are also entitled to individual rating and that, in the absence of any system of schedule rating, the individual experience of the risk is the proper guide for modifying basic rates. Furthermore, the plea in favor of experience rating is extended to manufacturing risks on the theory that schedule rating is not by itself capable of measuring the individual risk hazard. It is pointed out that schedule rating can only take account of the physical conditions surrounding the plant and that such physical conditions are not in all cases an absolute guide. Coupled with schedule rating there must be, in the opinion of these advocates, a system of experience rating so that not only the physical but the moral conditions of the risk may be properly appraised. It is stated that in the underwriting experience there will be found perfect plants possessing all the ideal attributes which would justify a maximum rate reduction under the schedule but that notwithstanding, for reasons which are not visible to the inspector, the accident rate is abnormally high. On the other hand, underwriters encounter risks physically sub-standard but producing nevertheless a favorable accident rate. Illustrations of this character serve to emphasize the argument that the moral character of the risk must be measured by a system other than schedule rating. The individual experience of the risk, if spread over a sufficiently long period and over an adequate pay roll exposure, is likely to give a truer indication of the risk hazard in so far at least as its moral aspects are concerned, and by moral aspects is meant the attitude of the employer, his foremen and superintendents towards the safety and welfare of the workmen. In the manufacturing plant, the physical valuation of the risk, combined with the experience valuation, will, under this theory, produce a rate which will reflect the risk hazard from its physical as well as its moral standpoint. In contracting, public service and miscellaneous

risks, the experience rating system as herein indicated may be used under this theory for differentiating the risk from the class rate.

The antagonists of experience rating combat this argument by the statement that the loss experience on any given risk is due to imperfect physical conditions and to the element of chance, that the general experience has been used to determine the rate for the class and that the rate thus obtained is an average rate which should apply to all plants without distinction as to the particular experience sustained in a given plant. It is the fundamental purpose of insurance to cover the risk against the losses due to chance and it is, therefore, unsound in theory to penalize an employer whose experience as a result of chance is bad or to reward another employer whose experience as a result of chance is good. Furthermore, all experience rating plans which have so far come under observation have not been balanced schemes and have resulted in decreasing the total volume of premiums. There should be no increase or decrease in premiums due to experience rating for the reason that the manual provides a system of average rates and unless loadings were provided to replace the depression due to experience rating, inadequate rates would result from the application of the system. But it is questionable whether it is justifiable to load the rates for any probable premium depression due to experience rating. Any experience rating system must necessarily be limited to a class of risks that produce a sufficiently large pay roll or premium. Assuming that only 20 per cent of the total number of risks enjoy the benefits of experience rating, is it proper to increase the rates for all employers in order to give the benefit of experience rating to a restricted class? Experiments with experience rating have been conducted in several states and the results so far have not been entirely satisfactory, principally perhaps for the reason that no adequate plan of experience rating has as yet been devised.

In the first two years of operation under the New York Act a system of experience rating was introduced in that state. The operation of the system, however, resulted in its application to selected risks, namely, those that have enjoyed a good experience, and the result produced a depression in premiums which could not have been offset in any other direction. The first experience rating plan was thereupon abandoned and a new plan introduced, effective as of June 30, 1916. It took several months to prepare the details

of the plan and in its preparation the authors had to effect a compromise between a variety of views. In its present development the plan provides for the obligatory application of experience rating to all manufacturing risks that produce a minimum pay roll of \$100,000 and an earned premium of \$500 for a period of not less than two years and to contracting and miscellaneous risks with a minimum pay roll of \$5,000 and an earned premium of \$500 for the same period. The past experience of the risk is used as a guide for determining the rate on the current policy. The insurance carrier is required to submit an application to the rating bureau with a specific list of compensatable accidents sustained during the period on which the rating is based. Such accidents are valued upon the basis of an established table arranged according to the type of injury, and the values are derived from the provisions of the statute and general insurance experience. The appraisal of the medical cost is determined by a fixed charge for each notice of injury. The maximum debits and credits depend upon two factors—loss ratio of the risk and the size of the premium. Beginning with a maximum value of 5 per cent for a \$500 premium, it extends to 20 per cent for a \$5,000 premium. If the loss ratio is more than 40 per cent and less than 65 per cent no modification is made, such risks falling within a so-called neutral zone. In the application of the plan, the rating bureau acts as the medium for exchange of experience data among insurance carriers, and establishes the rate upon the data submitted under the certificate of the insurance carrier. The rate when published becomes available to all insurance carriers and applies to the risk for a given policy term. This plan may be regarded so far as in its experimental stage. The valuation of six hundred risks has produced a net credit of 4 per cent.

One of the important criticisms in connection with the plan is the method of loss valuation; for instance, the fairness of charges established in cases of accidents resulting in death or total permanent disability. It is pointed out that in such cases, the table provides values equal to 324 weeks of compensation for fatal cases and 624 weeks of compensation for total permanent disability cases. Such charges easily result in rates being advanced to the extent of 20 per cent maximum limit. It is argued that injuries resulting in so serious a manner are purely a matter of chance and that it is, therefore, improper to advance the employer's rate because of the

occurrence of a single serious accident, which has the effect of distorting the entire experience of an otherwise favorable risk. Another point of criticism has been against the provision of the plan which requires a charge of \$12 for every notice of injury, as a medium of appraising the medical cost. The medical cost will differ with different employers and with different companies. Furthermore, some employers are very prompt in making reports of notices and others are quite negligent in this respect. The employer who is prompt in reporting notices of accidents apparently suffers under this scheme. The third point of criticism is the fact that under every plan so far advanced the results have produced a depression in premiums. This criticism requires very serious consideration for the reason that a loading on premium rates for this item is evidently improper.

Whatever merits the theory of experience rating may possess, it has not yet been possible to develop a plan that will produce rational results in its application. Until such plan has been developed, the critics are in a fair position to demand that individual rating of compensation risks should be entirely confined to the practice of schedule rating and that all efforts should be directed towards the highest development of schedule rating and its possible extension to a broader sphere than that provided under the present system. In the normal process of such development we may look forward to the construction of several schedules, each representing a distinct group of industrial activity.